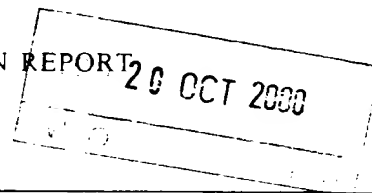


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference SPI/HER	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/11072	International filing date (day/month/year) 19 MAY 1999	Priority date (day/month/year) 19 MAY 1998
International Patent Classification (IPC) or national classification and IPC IPC(7): A23G 3/00, 3/30 and US Cl.: 426/3, 285, 453, 650, 658		
Applicant SPI POLYOLS, INC.		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	<p>This REPORT consists of a total of <u>4</u> sheets.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>0</u> sheets.</p>
3.	<p>This report contains indications relating to the following items</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 17 DECEMBER 1999	Date of completion of this report 22 SEPTEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer <div style="text-align: center;"> ARTHUR L. CORBIN </div>
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/11072

I. Basis of the report1. With regard to the **elements** of the international application:*☒ the international application as originally filed☒ the description:

pages 1-17 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the claims

pages 18-27 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the drawings:

pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the sequence listing part of the description:

pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
☐ filed together with the international application in computer readable form
☐ furnished subsequently to this Authority in written form
☐ furnished subsequently to this Authority in computer readable form
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
☒ the claims, Nos. NONE
☒ the drawings, sheets/fig NONE

5. ☒ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c))**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☒ restricted the claims.
☐ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☒ not complied with for the following reasons:

- I. Claims 1-15, 48-62, 78-83, 88-97, 99-101, 105, 106, 112-114
II. Claims 16-30, 102, 103
III. Claims 31-47, 63-77, 104, 107, 108
IV. Claims 84-87, 98, 109, 111
V. Species of claims 2, 64, 95, 96

The claims of the five groups are directed to different inventions which are not linked to form a single general concept. The claims in the different groups do not have in common the same or corresponding "special technical features". In particular, the method of each group is different from the method in the other groups in that the Group I method, product and composition minimizes the degradation of an acid-sensitive additive, the group II method increases salivation during chewing, the method and product in Group III remove or prevent plaque deposition on teeth, and the method and product thereof in Group IV requires a specific sequence of steps not present in the other groups. Further the species recited in Group V are completely different from each other, unrelated and are not interchangeable.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts
☒ the parts relating to claims Nos. (Please See supplemental sheet)

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims	<u>(Please See supplemental sheet)</u>	YES
	Claims	<u>(Please See supplemental sheet)</u>	NO
Inventive Step (IS)	Claims	<u>(Please See supplemental sheet)</u>	YES
	Claims	<u>(Please See supplemental sheet)</u>	NO
Industrial Applicability (IA)	Claims	<u>(Please See supplemental sheet)</u>	YES
	Claims	<u>(Please See supplemental sheet)</u>	NO

2. citations and explanations (Rule 70.7)

Claims 1-4, 6-10, 48-51 and 53-57 lack novelty under PCT Article 33(2) as being anticipated by DuRoss (cols. 5 and 6), Arima et al (cols. 3 and 5) or Schobel et al (cols. 5-8). Each patent discloses preparing a confectionery product, e.g. chewing gum, including a co-processed composition composed of citric acid and mannitol, as well as a flavor.

Claims 5, 11-15, 52, 58-62, 100, 101, 105 and 106 lack an inventive step under PCT Article 33(3) as being obvious over DuRoss, Arima et al or Schobel et al. Inorganic acids, e.g. phosphoric acid, and sugars, e.g. sucrose, are conventional chewing gum additives. Further, it would have been obvious to include an abrasive, e.g. kaolin, together with the acid in each primary reference since it is old to prepare chewing gum containing an acid and an abrasive, e.g. kaolin, to aid in removing plaque from teeth, as taught by applicant's prior art admission (page 6, lines 26-27 and page 7, lines 10-11). The moisture content of the chewing gum (claims 13-15, 60-62) is an obvious matter of choice depending upon desired results, personal reference and consumer appeal, and is not critical.

Claims 1-4, 6-12, 48-51 and 53-59 lack novelty under PCT Article 33(2) as being anticipated by Witzel et al. (cols. 5-7 and 10). Witzel et al discloses preparing chewing gum including a co-processed composition composed of citric acid and a sweetener, e.g. mannitol or sucrose, glucose or fructose, as well as a flavor.

Claims 5, 13-15, 52, 60-62, 100, 101, 105 and 106 lack an inventive step under PCT Article 33(3) as being obvious over Witzel et al.

Applicant is referred to the reasoning set forth in the second paragraph above.

Claims 78-80 lack novelty under PCT Article 33(2) as being anticipated by Smeltz. Smeltz (abstract) discloses combining mannitol with lactic acid, malic acid, citric acid or tartaric acid to provide an aqueous solution, which is subsequently reacted with a titanium compound.

Claims 78, 80, 82 and 83 lack novelty under PCT Article 33(2) as being anticipated by Beres et al (col. 3, line 42 and col. 5, lines 30-39). Beres et al discloses granules composed (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

5. (Some) amendments are considered to go beyond the disclosure as filed:
NONE

IV. LACK OF UNITY OF INVENTION:

4. The parts of the international application relating to claim number(s) 1-15, 48-62, 78-83, 88-97, 99-101, 105, 106, 112-114 were the subject of international preliminary examination in establishing this report.

V. 1. REASONED STATEMENTS:

The report as to Novelty was positive (YES) with respect to claims 5, 13-15, 52, 60-62, 81, 99-101, 105, 106, 112-114.

The report as to Novelty was negative (NO) with respect to claims 1-4, 6-12, 48-51, 53-59, 78-80, 82, 83, 88-97.

The report as to Inventive Step was positive (YES) with respect to claims NONE.

The report as to Inventive Step was negative (NO) with respect to claims 1-15, 48-62, 78-83, 88-97, 99-101, 105, 106, 112-114.

The report as to Industrial Applicability was positive (YES) with respect to claims 1-15, 48-62, 78-83, 88-97, 99-101, 105, 106, 112-114.

The report as to Industrial Applicability was negative (NO) with respect to claims NONE.

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

primarily of equal parts of malic acid and mannitol, which are prepared by granulating and then drying a mixture of mannitol, malic acid and water.

Claims 78 and 88-97 lack novelty under PCT Article 33(2) as being anticipated by Barnett et al (pages 5-8, 11, 12). Barnett et al discloses a sweetener which may be composed of only mannitol and aminobenzoic acid. The sweetener is used to sweeten chewing gum, confections, pudding, etc.

Claims 78, 79 and 82 lack novelty under PCT Article 33(2) as being anticipated by Smith et al (col. 1, lines 49-53 and Ex. 1). Smith et al discloses a composition composed primarily of mannitol and citric acid in agglomerated or tablet form prepared by agglomerating and then drying a mixture of the components.

Claim 81 lacks an inventive step under PCT Article 33(3) as being obvious over Smeltz, Beres et al, Barnett et al or Smith et al.

Finding the optimum amount of each component in the composition would require nothing more than routine experimentation by one reasonably skilled in this art.

Claims 79 and 99 lack an inventive step under PCT Article 33(3) as being obvious over Beres et al. It would have been obvious to substitute any of the acids claimed in claims 2 and 8 for the malic acid in Beres et al since all are well known food acidulants.

Also, see the last sentence in the preceding paragraph.

Claims 82 and 83 lack an inventive step under PCT Article 33(3) as being obvious over Barnett et al in view of Beres et al.

It would have been obvious to prepare the sweetener in Barnett et al by granulating or agglomerating in the presence of water and then drying to form granules or agglomerates, i.e. tablets, since such a procedure for preparing a sweetener composition is old, as evidenced by Beres et al.

Claims 80 and 99 lack an inventive step under PCT Article 33(3) as being obvious over Smith et al.

It would have been obvious to substitute malic or phosphoric acid for the citric acid in Smith et al since all are well known food acidulants.

Claim 83 lacks an inventive step under PCT Article 33(3) as being obvious over Smith et al in view of Beres et al.

It would have been obvious to use the tablet in Smith et al in granule form since granules and tablets are alternative forms of sweetening compositions containing mannitol and an acidulant, as evidenced by Beres et al (col. 3, line 42).

Claims 112-114 lack an inventive step under PCT Article 33(3) as being claims over Barnett et al. It would have been obvious to substitute phosphoric acid for the aminobenzoic acid in Barnett et al since both are well known food acidulants and since phosphoric acid is a conventional acid used in chewing gum. Also, with respect to claim 113, see the third sentence in the second paragraph of the negative statements herein.

Claims 1-15, 48-62, 78-83, 88-97, 99-101, 105, 106 and 112-114 meet the criteria of PCT Article 33(4) since the product can be used as a confectionery product or a part thereof, and the process can be used to prepare a confectionery product or a component thereof.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 11

----- NEW CITATIONS -----

NONE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/11072

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : A23G 3/00, 3/30

US CL : 426/3, 285, 453, 650, 658

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 426/3, 4, 5, 6, 285, 453, 650, 658

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,023,092 A (DROSS) 11 June 1991 (11.06.91), see entire document.	1-4, 6-10, 48-51, 53-57 ----- 5, 11-15, 52, 58-62, 100, 101, 105, 106
X --- Y	US 4,556,565 A (ARIMA ET AL) 03 December 1985 (03.12.85), see entire document.	1-4, 6-10, 48-51, 53-57 ----- 5, 11-15, 52, 58-62, 88-97, 100, 101, 105, 106, 112-114

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*C* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

30 JULY 1999

Date of mailing of the international search report

23 AUG 1999

Name and mailing address of the ISA/US
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Washington, D.C. 20231

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Telephone No. (703) 308-3850

INTERNATIONAL SEARCH REPORT

 International application No.
 PCT/US99/11072

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 4,824,681 A (SCHOBEL ET AL) 25 April 1989 (25.04.89), see entire document.	1-4, 6-10, 48-51, 53-57 ----- 5, 11-15, 52, 58- 62, 88-97, 100, 101, 105, 106, 112- 114
X --- Y	US 4,238,475 A (WITZEL ET AL) 09 December 1980 (09-12-80), see entire document.	1-4, 6-12, 48-51, 53-59 ----- 5, 13-15, 52, 60- 62, 100, 101, 105, 106
Y	US 4,400,372 A (MUHLER ET AL) 23 August 1983 (23.08.83), see entire document.	101, 106, 113
X --- Y	US 5,021,171 A (SMELTZ) 04 June 1991 (04.06.91), see entire document.	78-80 ----- 81
X --- Y	US 5,707, 654 A (BERES ET AL) 13 January 1998 (13.01.98), see entire document.	78, 80, 82, 83 ----- 79, 81-83, 88-97, 99, 112-114
X --- Y	EP 0,131,640 A (BARNETT ET AL) 23 January 1985, (23.01.85), see entire document.	78, 88-97 ----- 81-83, 99, 112- 114
X ---- Y	US 5,254,355 A (SMITH ET AL) 19 October 1993 (19.10.93), see entire document.	78, 79, 82 ----- 80, 81, 83, 99

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/11072

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- I. Claims 1-15, 48-62, 78-83, 88-97, 99-101, 105, 106, 112-114.
- II. Claims 16-30, 102, 103.
- III. Claims 31-47, 63-77, 104, 107, 108.
- IV. Claims 84-87, 98, 109-111.
- V. Species of claims 2, 64, 95, 96.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-15, 48-62, 78-83, 88-97, 99-101, 105, 106, 112-114; Species is chewing gum

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

PCT

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A23G 3/00, 3/30		A1	(11) International Publication Number: WO 99/59427
			(43) International Publication Date: 25 November 1999 (25.11.99)
(21) International Application Number: PCT/US99/11072		(74) Agents: McSHANE, William, E., Connolly, Bove, Lodge & Hutz, 1220 Market Street, P.O. Box 2207, Wilmington, DE 19899 (US) et al.	
(22) International Filing Date: 19 May 1999 (19.05.99)			
(30) Priority Data: 09/080,970 19 May 1998 (19.05.98) US		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application US 09/080,970 (CIP) Filed on 19 May 1998 (19.05.98)		Published With international search report.	
(71) Applicants (for all designated States except US): SPI POLY-OLS, INC. [US/US]; 321 Cherry Lane, New Castle, DE 19720 (US). HERSHEY FOODS CORPORATION [US/US]; 100 Crystal A Drive, Hershey, PA 17033 (US).			
(72) Inventors; and (75) Inventors/Applicants (for US only): LE, Anh [US/US]; 1208 Janice Drive, Newark, DE 19713 (US). HUZINEC, Robert [US/US]; 1325 Farmhouse Road, Hummelstown, PA 17036 (US).			
(54) Title: CO-PROCESSED COMPOSITIONS OF ACIDS AND WATER SOLUBLE CRYSTALLINE COMPOUNDS AND RELATED PRODUCTS AND METHODS			
(57) Abstract <p>The invention includes co-processed compositions containing at least one acidulent and at least one water-soluble crystalline compound for use in shelf-stable low-moisture comestible, confectionery, dentifrice, or pharmaceutical products containing acid-sensitive additives. The invention also includes methods of minimizing the degradation of an acid-sensitive additive by at least one acidulent in low-moisture comestible, confectionery, dentifrice, or pharmaceutical products that contain at least one acidulent by using the co-processed compositions of the present invention. The invention also includes methods of increasing salivation and methods of removing or preventing the deposition of plaque on teeth using the co-processed compositions of the present invention. Examples of low-moisture comestible, confectionery, pharmaceutical or dentifrice products in which the co-processed compositions may be used are chewing gum, bubble gum, instant beverages, frozen desserts, toothpaste and dental floss.</p>			

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